Biodiversity & Runoff
Best Management Practices
for Protection and Productivity

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Syngenta

Hungary

OperationPollinator

Multifunctional Landscapes

- Biodiversity enhancement for pollinating insects and other beneficials
- Flower rich vegetative strips on the edge on agricultural production fields
- Foraging crop: rich in nectar and pollen + nesting place
- Dissemination & Monitoring

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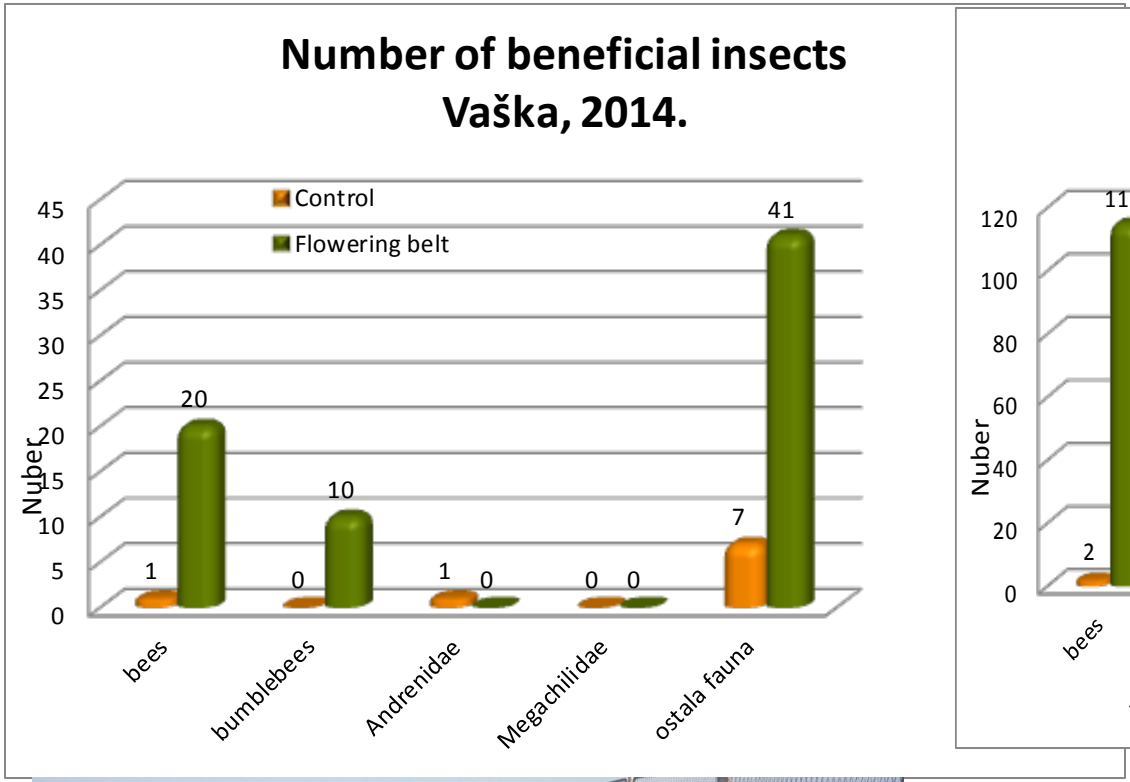
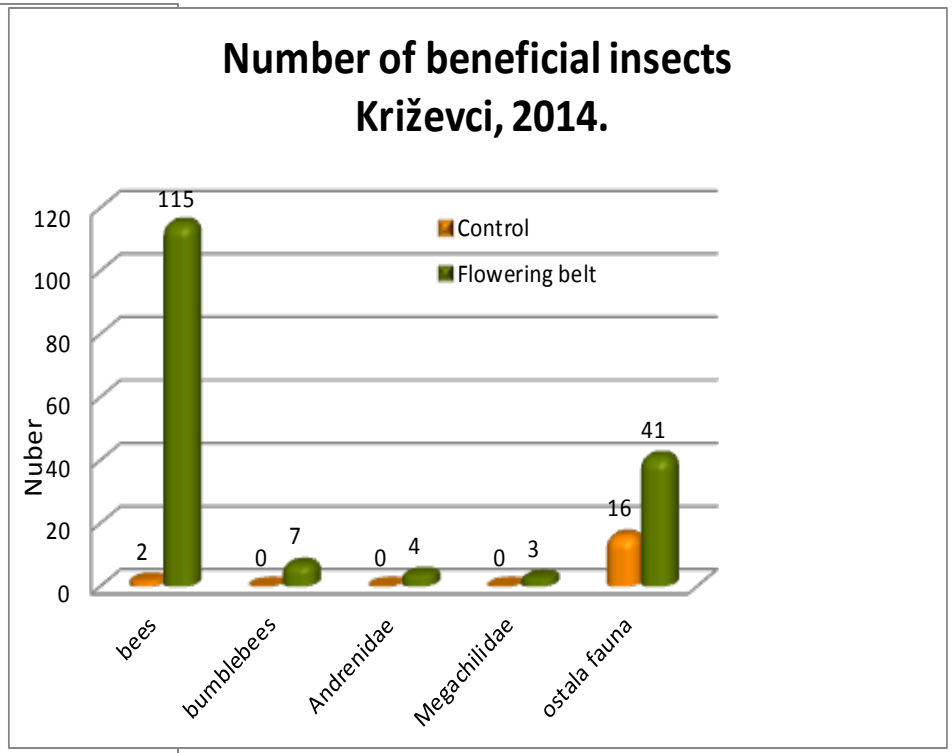
Operation Pollinator - Results in Croatia






OP on Vegetables -Podravka


OP - Koprivnički Bregi

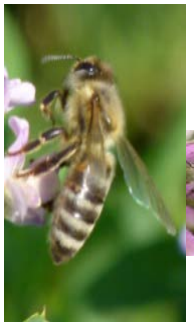
Biodiversity enhancement results in Hungary

- 5 years monitoring data 2010-2014
- 320 monitoring locations, 46 000 detected insects
- Operation Pollinator edges vs. common agricultural field edges (Control)

- Learnings
  - Pollinators' visits on OP edges outperform the Control agricultural edges
  - Weather condition is the most important factor on abundance
    - Overwintering capability, Early spring flowers availability

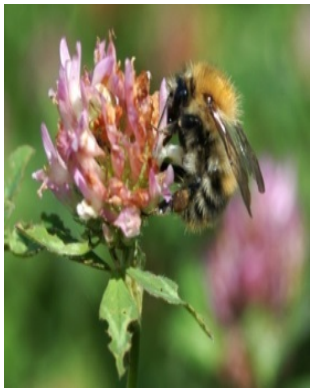
Increase factor of Pollinators' adundance on OP edges vs Control

Hungary 2011-2014



Honey bee

Species collecting pollen on legs



Bombus spp

Hoverfly Syrphoidae

Species collecting pollens on abdomen

Butterflies

							No of detected insects
2011/1	12,1	21,0	14,5	1,1	1,8	1,7	9881
2011/2	2,6	2,2	10,8	0,9	1,9	2,6	2017
2012	5,2	4,6	4,3	1,4	13,4	1,6	9027
2013	5,7	6,5	3,9	1,6	7,0	2,2	7918
2014	8,0	5,5	5,8	1,8	3,6	2,5	12759
Average increase	**6,7**	**8,0**	**7,9**	**1,4**	**5,5**	**2,1**	41602

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- Monitoring - improved **diversity of species** and **abundance** of Hymenoptera
  - High abundance of Apidae, Bombidae, Megachiliadae, Andrenidae on OP edges vs controll agricultural edges

- Flower rich plant mixture from local plant species
- Seasonlong and multi-year flower sources and nesting place for pollinators
- Cutting regime sustains multi-year habitat

- Overal biodiversity increase: wild birds, small mammals, games

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Practice for Runoff management

- Managing agricultural runoff into surface water
- Vegetative **buffer strips** at the bottom of agricultural production fields
  - reduce eroded soil deposit on water catchment area
  - prevent agricultural chemicals runoffs and pollution into surface water

What is MARGINS ?
Managing Agricultural Runoff Generation INto Surface water

- In-field & edge-of-field management of pesticide runoff

- Components
  - 2 Soil managements
  - Vegetative Buffers attached
  - Maize cropping with herbicide weed control
  - Collection / analysis of runoff components
  - 2014 runoff data

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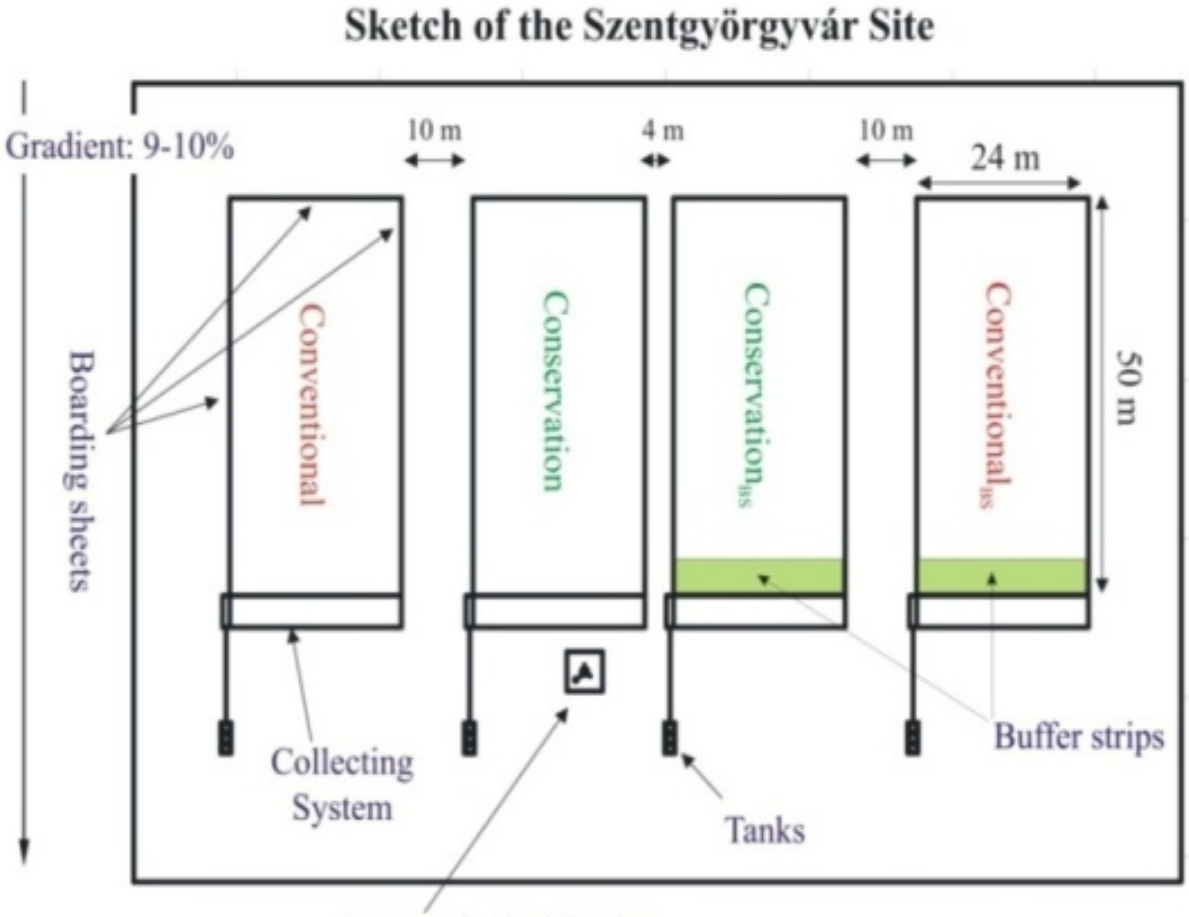
Vegetative buffer strip next to runoff collection



Tanks collect runoff

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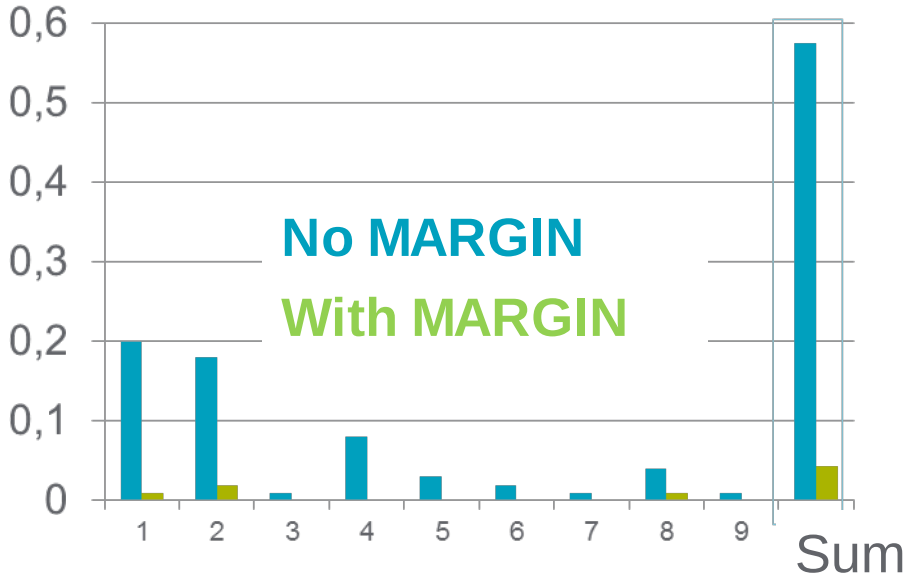
Runoff on ploughed field (conventional soil management)



2014 Runoff data

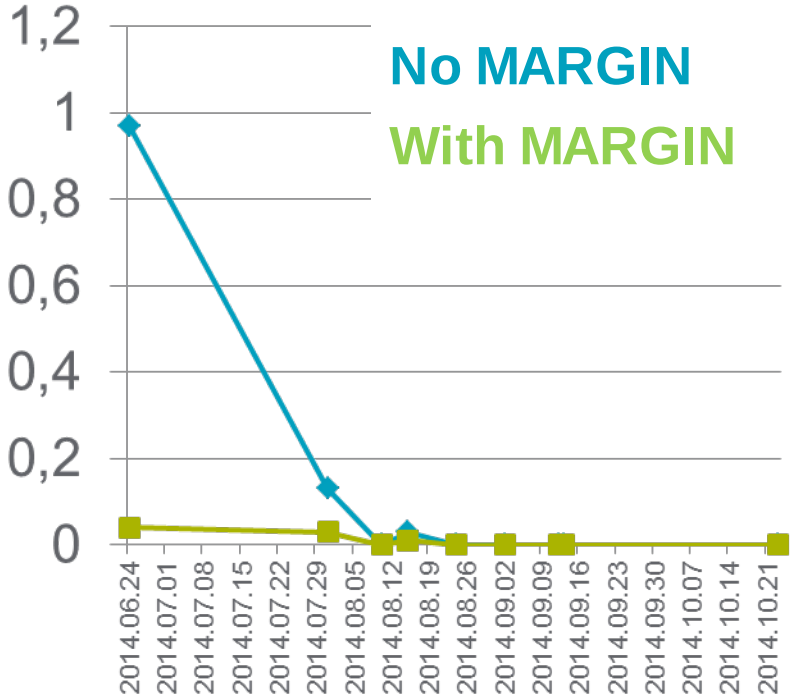
- 9 runoff events (June-Sept)
- 140 m3/ha runoff
- 35 m3/ha runoff with MARGIN vegetative strip
- 70% runoff efficacy with MARGIN

Soil erosion

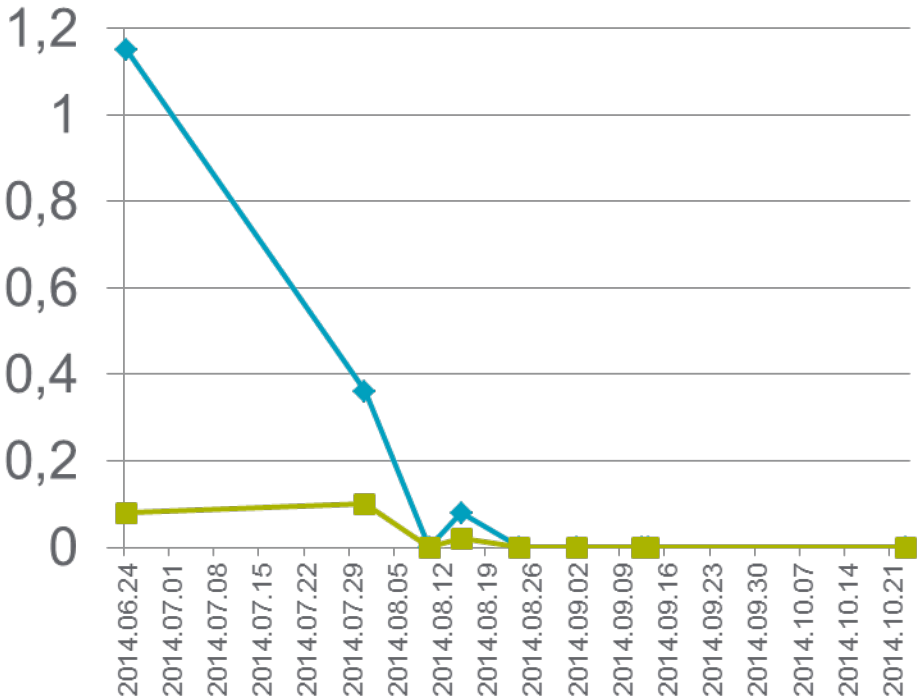
- 0,6 ton/ha
- 0,05 ton/ha with MARGIN vegetative buffer strip
- 95% efficacy with MARGIN

Pesticide runoff g/ha - Margin reduced pesticide runoffs

terbutilazine g/ha



S-metholachlor g/ha



- 500 g/ha terbutilazine, 1500 g/ha S-metholachlore sprayed
- 1 g/ha detected in the first runoff detected on ploughed field
- vegetative buffer stip minimized the pesticide runoffs

sprayed : TBA : 500 g/ha SMOC : 1400 g/ha

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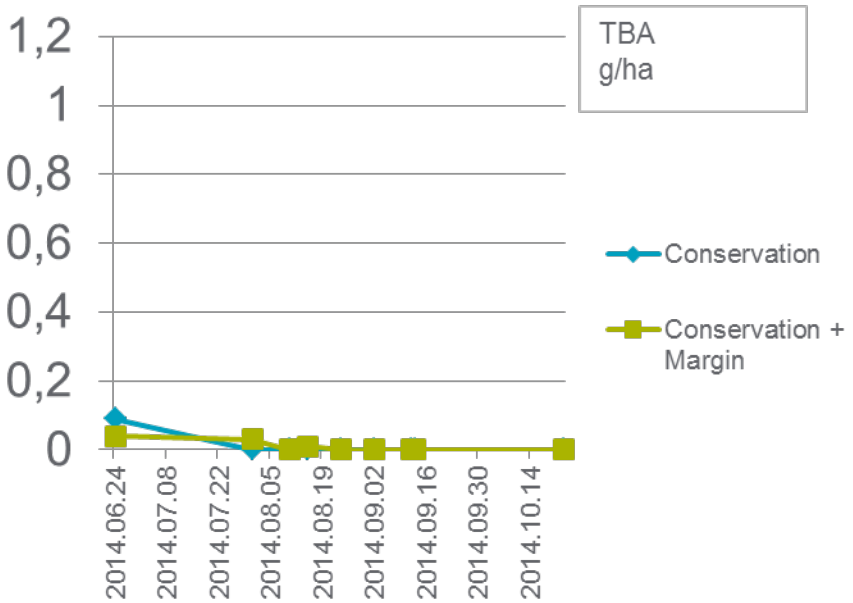
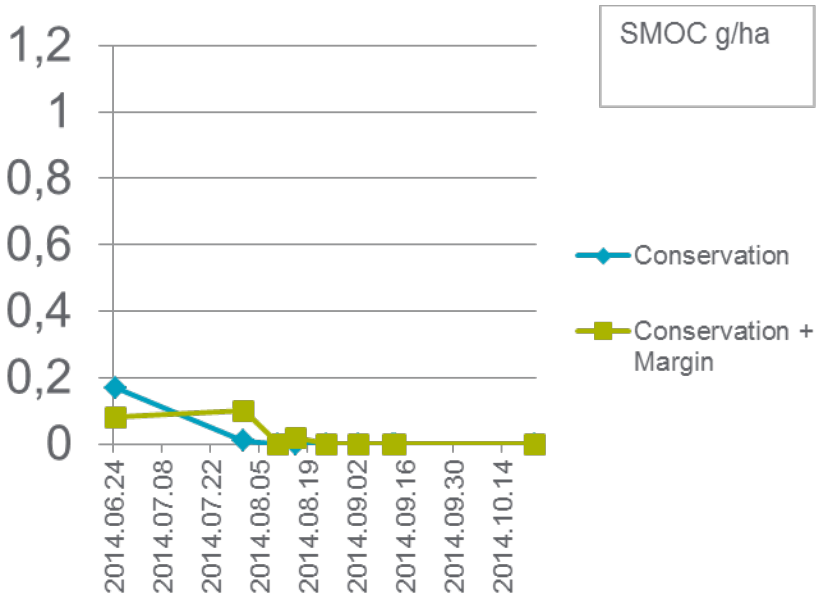
Pesticides runoff g/ha – Conservation soil management + Margin reduced pesticide runoffs





- Conservation soil management + MARGIN vegetative buffer efficiently recuced the pesticide runoff-s

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Conclusion

- Surface water protection
  - via runoff mitigation
- Biodiversity enhancement
  - flower mix habitats for pollinators

- Combining two programs- opportunity to manage **both objectives on the same field at the same time**
  - Syngenta approach to promote

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Research cooperation with

- Academy of Science Geographical Research Institute, Budapest, Hungary
- St. Stephan University, Gödöllő, Hungary
- Zagreb University, Agriculure Faculty, Agricultural Zoology, Zagreb, Croatia
- Institute of Forage Crops, Pleven, Bulgaria
- Agricultural University, Plant Protection and Agroecology, Pleven, Bulgaria
- Benaki Phytopathological Institute, *Dept.* Pesticides Control and Phytopharmacy, Athen, Greece